Electronic Version
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Claims

[c1] 1.A color filter structure of a liquid crystal display (LCD) comprising:
a substrate; and
a plurality of color filters coupling with each other on a surface of the substrate;
wherein an overlapping region exists between any two neighboring color filters, and each overlapping region and the color filters outside the overlapping region are coplanar.

[c2] 2.The color filter structure of claim 1 wherein the LCD is a low temperature polysilicon thin film transistor (LTPS TFT) LCD.

[c3] 3.The color filter structure of claim 1 wherein the substrate further comprises a pixel array positioned under the color filters and a transparent conductive layer positioned over the color filters.

[c4] 4.The color filter structure of claim 3 wherein the LCD is a color filter on array (COA) LCD.

[c5] 5.The color filter structure of claim 3 further comprising a contact plug for connecting the pixel array and the

transparent conductive layer.

[c6] 6.The color filter structure of claim 1 wherein the substrate is a transparent glass substrate.

[c7] 7.The color filter structure of claim 1 wherein the color filters positioned in a bottom layer of the overlapping region have a first thickness, the color filters outside the overlapping region have a second thickness, and a value of the first thickness is at least half of a value of the second thickness.

[c8] 8.The color filter structure of claim 1 wherein the overlapping region serves as a black matrix.

[c9] 9.The color filter structure of claim 1 wherein the substrate further comprises a black matrix layer positioned between any two neighboring color filters.

[c10] 10.The color filter structure of claim 1 wherein the color filters comprising at least a first color filter, a second color filter, and a third color filter.

[c11] 11.The color filter structure of claim 10 wherein the first color filter has an inverse T-shaped structure, the second color filter has a stair-shaped structure, and the third color filter structure has a T-shaped structure.

[c12] 12.The color filter structure of claim 10 wherein the

color filters comprise at least a red color filter, a green color filter, and a blue color filter.

[c13] 13.A method for forming a color filter structure of a liquid crystal display (LCD), the method comprising:
providing a glass substrate;
forming a first color filter on the glass substrate; and
forming a second color filter which couples with the first color filter on the glass substrate;
wherein an overlapping region exists between the first color filter and the second color filter, and the overlapping region, the first color filter, and the second color filter outside the overlapping region are all approximately coplanar.

[c14] 14.The method of claim 13 wherein the LCD is a low temperature polysilicon thin film transistor (LTPS TFT) LCD.

[c15] 15.The method of claim 13 wherein an attenuated mask is employed to define patterns of the first color filter and the second color filter.

[c16] 16.The method of claim 15 wherein the attenuated mask comprises at least a transparent region and a translucent region.

[c17] 17.The method of claim 13 wherein steps of forming the

first color filter further comprises:
forming a first color filter layer on the glass substrate;
providing an attenuated mask comprising at least a transparent region and a translucent region; and
performing a first photo process to form a first pattern corresponding to the transparent region and a second pattern corresponding to the translucent region in the first color filter layer, the first pattern and the second pattern having different thicknesses.

[c18] 18.The method of claim 17 wherein steps of forming the second color filter comprises:
forming a second color filter layer on the glass substrate, the second color filter layer overlapping a portion of the first color filter layer; and
performing a second photo process by the attenuated mask to form a third pattern in the second color filter layer, the third pattern overlapping the second pattern of the first color filter layer, and to form a fourth pattern having a thickness differing from a thickness of the third pattern in the second color filter layer, the third pattern and the fourth pattern being coplanar.

[c19] 19.The method of claim 18 wherein the first photo process and the second photo process are performed under like conditions.

[c20] 20.The method of claim 13 wherein the second color filter positioned in the overlapping region covers the first color filter, and a thickness of the first color filter in the overlapping region is at least half of a thickness of the first color filter outside the overlapping region.

[c21] 21.The method of claim 13 wherein the overlapping region serves as a black matrix.

[c22] 22.The method of claim 13 wherein the glass substrate further comprises a black matrix layer positioned between the first color filter and the second color filter adjacent to the first color filter.